CHAPTER 1

INTRODUCTION

1.1 Background of Study

The oil palm industry in Malaysia started 80 years ago in a modest way. The government has spent almost RM350 million for the replanting process of oil palm in order to control its quality. The purpose is to increase the production of Crude Palm Oil (CPO). CPO can be used in pavement as an additive which have many benefits for the pavement performance and also helps a lot in energy saving. Increasing of energy cost has triggered the development of alternative binders to modify and enhance the asphalt binders (John, 2012).

Warm Mix Asphalt (WMA) is now being proposed as an alternative for the conventional asphalt as it can be produced at low temperature of about 105˚C to 135˚C. It has been observed that most of the alternative binders contain somehow similar to those of conventional asphalt binders. However, the binders have their own variability in the aspect of properties. In order to ensure that the binder behaviour brings the positive effect to the asphalt itself, it is important to carefully design the asphalt mixtures.

Using Crude Palm Oil (CPO) as an additive in asphalt pavement could reduce mixing time, compaction temperatures, aging, and stiffening characteristics of the asphalt pavement itself. For this reason, more research and experimental work needed to be done to evaluate the material performance on the physical and chemical properties of asphalts.

1.2 Problem Statement

Emission of heat and odour during placement are dangerous to the public near the construction site and most affected is the construction workers. Moreover, PAH which is Polycyclic Aromatic Hydrocarbon where the most dangerous fumes emission can be found during mixing process of Hot Mix Asphalt (HMA). PAH contains carcinogenic, mutagenic and teratogenic in which can be hazardous to health. Saving energy consumption surely helps in emission of greenhouse gases and conservation of natural resources.

1.3 Objective

The objectives of the study are:

- To determine the potential of 0.3% of the content of Crude Palm Oil (CPO) from the total mix design and three different mixing temperature in which at lower than the standard HMA. The mixing temperature of 150˚C, 160˚C and 170˚C is to prepare standard specimens of asphalt concrete in determination of stability and flow in Marshall apparatus.

- To determine whether the volumetric properties of modified Hot Mix Asphalt (HMA) comply with all the parameter set by PWD Malaysia's Standard Specification for Road Works (JKR/SPJ/2008-S4) mix design can be comply.

1.4 Scope of Study

The scopes of this study are:

- The aggregate and bitumen used in this mix design must be evaluated first. There are two (2) tests to be conducted on the aggregates which are, Los Angeles Abrasion Test and Specific Gravity of Aggregates. There are two (2) tests that have to be conducted on the asphalt which are, Softening Point Test and Penetration Test.

- Marshall Method shall be applied in order to investigate the effect of Crude Palm Oil (CPO) as an additive in asphalt mixture. The study will be done with two (2) stages and the total samples of Hot Mix Asphalt produced is 30 samples. The first stage involves of producing 15 ordinary samples of Hot Mix Asphalt in order to find the Optimum Asphalt Content (OAC). Then, another 15 samples of Hot Mix Asphalt with three (3) different mixing temperatures and an adequate quantity of Crude Palm Oil which should be added in the samples respectively.